

PROJECT BRIEF

1. IDENTIFIERS:

PROJECT NUMBER:	RLA/00/G31
PROJECT NAME:	Caribbean Renewable Energy Development Programme
DURATION:	5 Years
IMPLEMENTING AGENCY:	United Nations Development Programme
EXECUTING AGENCY:	Caribbean Community (CARICOM)
REQUESTING COUNTRY:	Antigua and Barbuda, the Bahamas, Barbados, Belize, British Virgin Islands, Cuba, Dominica, Grenada, Guyana, Jamaica, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Suriname, Trinidad and Tobago and Turks and Caicos ¹
ELIGIBILITY:	All countries have ratified the UNFCCC and are eligible for GEF support through the financial mechanism of the Convention (see footnote 1 for exception)
GEF FOCAL AREA:	Climate Change
GEF PROGRAMMING FRAMEWORK:	OP #6: Adoption of Renewable Energy by Removing Barriers and Reducing Implementation Costs

2. **SUMMARY:** This project aims at removing barriers to renewable energy utilisation in the Caribbean. Through specific actions to overcome policy, finance, capacity and awareness barriers it is estimated that the contribution of renewable energy sources to the region's energy balance will be significantly increased. Currently, renewable energy provides less than 2% of the region's commercial electricity. It is estimated that due to the planned barrier removal activities the share of renewable energy could reach 5% by 2015. This would imply annual reductions of CO₂ emissions by some 680,000 tons. Part of the GEF funding will be used through non-grant instruments to remove incremental risks related to RE investments thus improving the cost-effectiveness of the GEF resource utilisation.

3. COSTS AND FINANCING (MILLION US\$):

GEF:	Project:	4.076
	PDF B:	0.350
	Sub-Total GEF:	4.426
COFINANCING:	Governments + reg./nat. instit.:	1.150
	Other donors:	1.300
	Equity (private/public):	6.000
	Loans (CDB etc.):	4.000
	Sub-Total Co-financing:	12.450
TOTAL PROJECT COST:		16.876

¹ British Virgin Islands and Turks and Caicos are not eligible for GEF support and all the costs resulting from their participation will be borne by their respective governments

4. **ASSOCIATED FINANCING:** N/A

5. **OPERATIONAL FOCAL POINT ENDORSEMENT:**

St. Vincent and Grenadines: Dr. Reynold Murray, Environmental Services Coordinator, Ministry of Health and the Environment, 19 May 2000

St. Lucia: Bernard La Corbiniere, GEF Focal Point, Government of Saint Lucia, Ministry of Development, Planning, Environment and Housing, 22 May 2000

Belize: Henry Usher, EF Operational Focal Point for Permanent Secretary Ministry of Economic Development, Government of Belize, May 25, 2000

Jamaica: Leonie Barnaby for Permanent Secretary, Office of the Deputy Prime Minister and Ministry of Land and Environment, May 26, 2000

Trinidad and Tobago: Dave McIntosh, Managing Director/CEO, Environmental Management Authority, 26 May 2000

Barbados: Diane Campbell for Permanent Secretary, Ministry of Environment, Energy and Natural Resources, May 31, 2000

Grenada: GEF Operational Focal Point, Ministry of Finance, June 1, 2000

Suriname: Winston W. Wirht, Vice President the Nation Council on Environment, NIMOS, June 1, 2000

St. Kitts and Nevis: Raymond Solomon, Director of Environment, St Christopher and Nevis, Ministry of Health and Environment, Department of Environment, 1 June 2000

Dominica: Eliud T. Williams, Permanent Secretary, Ministry of Agriculture & The Environment, June 2, 2000

Guyana: Navin Chandarpal, Presidential Adviser on Science, Technology and the Environment, Office of the President, 2 June 2000

Antigua and Barbados: Diann Black Layne, GEF National Operational Focal Point, Government of Antigua and Barbuda, 13 June 2000

Belarus: Donald Cooper,(for) Permanent Secretary, The Bahamas Environment, Science and Technology Commission, Office of the Prime Minister, 22 June 2000

Cuba: Humberto Arango Sales, Director, Punto Focal Operacional del GEF, Ministerio De Ciencia, Tecnologia Y Medio Ambiente, 23 June 2000

6. **IA CONTACTS:**

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LIST OF ACRONYMS AND ABBREVIATIONS

ACS	Association of Caribbean States
BOT	Build-Operate-Transfer
BOOT	Build-Operate-Own-Transfer
BOO	Build-Operate-Own
CARICOM	Caribbean Community
CARILEC	Caribbean Electric Utility Services Corporation (St. Lucia)
CAST	College of Art, Science and Technology (Jamaica)
CC	Climate Change
CCST	Caribbean Council for Science and Technology
CDB	Caribbean Development Bank
CEAP	Caribbean Energy Action Program
CEIS	Caribbean Energy Information System
CERMES	Centre for Resource Management and Environmental Studies (Barbados)
CSES	Caribbean Solar Energy Society
CTCS	Caribbean Technical Consultancy Service
DSM	Demand Side Management
EE	Energy efficiency
ESMAP	Energy Sector Management Assistance Programme
FC	Financial Co-operation
GEA	Guyana Energy Agency
GEF	Global Environment Facility
GEG	Gross Electric Generation
GHG	Greenhouse Gas
GNP	Gross National Product
GOJ	Government of Jamaica
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit GmbH (Germany)
HEART	Human Education and Resource Training
IADB	Inter-American Development Bank
IPP	Independent Power Producers
JBS	Jamaica Bureau of Standards
JPS	Jamaica Power Service
KfW	Kreditanstalt für Wiederaufbau (Germany)
LCP	Least Cost Planning
MME	Ministry of Mining and Energy
NFP	National Focal Point
NPV	Net Present Value
OAS	Organisation of American States
OECS	Organisation of Eastern Caribbean States
OLADE	Latin-American Energy Organization
PCJ	Petroleum Corporation of Jamaica
PMU	Project Management Unit
PPA	Power Purchase Agreement
PV	Photovoltaic
PVP	Photovoltaic Pumps
REAP	Regional Energy Action Plan

RE	Renewable Energy
RET	Renewable Energy Technologies
SHP	Small Hydropower Station
SHS	Solar Home System
SRC	Scientific Research Council (Jamaica)
SWH	Solar Water Heater
TC	Technical Co-operation
UNDP	United Nations Development Programme
UTECH	University of Technology (Jamaica)
UWI	University of the West Indies
WB	World Bank

1. BACKGROUND AND CONTEXT

1. The Caribbean region is currently heavily dependent on fossil fuels, with petroleum products accounting for an estimated 93 percent of commercial energy consumption. In the business as usual scenario, renewable energy technologies are likely to provide less than 2 percent of the region's commercial electricity by 2015. Despite the Caribbean's substantial renewable energy resources, exploitation lags far behind their potential due to policy, finance, capacity and awareness barriers.

2. In 1998 the following 16 Caribbean countries agreed to work together to prepare a regional project to remove barriers to the use of renewable energy and thereby foster its development and commercialisation.

Antigua and Barbuda	Guyana
The Bahamas	Jamaica
Barbados	St Kitts and Nevis
Belize	St Lucia
British Virgin Islands	St Vincent and the Grenadines
The Republic of Cuba	Suriname
Dominica	Trinidad and Tobago
Grenada	Turks and Caicos Islands

3. The proposed project is based on the results of a PDF Block B executed by the Caribbean Energy Information System (CEIS) in close co-operation with these countries and other regional institutions. During the PDF B phase, the different barriers to renewable energy in the aforementioned countries were analysed and a preliminary project proposal was formulated by an external consultant. The reports resulting from the PDF activities were discussed in a regional workshop in Grenada in February 2000. The final reports that incorporate the comments and suggestions presented in the workshop are available upon request from UNDP/GEF.²

1.1 ENERGY POLICY IN THE CARIBBEAN

1.1.1 Privatisation and Market Liberalisation

4. The energy policy pursued most widely by Caribbean governments in recent years has been the privatisation of a number of formerly state-owned electric utilities, the most recent being Belize and Guyana. Privatisation is motivated, amongst other reasons, by budgetary pressures, a need to improve efficiency, and a desire to attract private capital. Usually, through privatisation, restructuring and cost reductions have taken place, government subsidies to the energy sector have been reduced, and competition has increased.

² Caribbean Renewable Energy Development Project: Volume I, Barrier Assessment and Project Proposal
Caribbean Renewable Energy Development Project: Volume II, Country Reports
Both documents were prepared by Projekt-Consult GmbH for the Caribbean Energy Information System (CEIS).

5. Liberalisation has raised some questions. Does it satisfactorily address security of supply, extend accessibility to energy services, and promote sustainable development? Does the government have sufficient, or any, control over the activities of the utility, once privatised? Many privately owned utilities believe that they should serve their clients by focusing on efficiency, including cost-effective technologies; and that making electricity available to the poor and rural areas is mainly an issue for social policy.
6. The answer, generally, is that there is a need for policymakers to introduce effective, strong and transparent regulatory frameworks, and to desist from detailed interference in the sector. This regulatory framework should set clear guidelines as to what utilities are supposed to do and what incentives they will be allowed for the pursuit of social objectives. The relationship of governments to utilities is the first of the areas in which a regional energy programme should seek to offer assistance.

1.1.2 Energy Efficiency

7. Energy efficiency (EE), usually in the form of Demand Side Management (DSM) should be a high priority when it comes to meeting increasing electricity demands, considering that EE measures can usually be taken immediately and often without major investment, especially at the end-user level. It is a widely known truth that the cheapest kWh is the saved one.
8. A country with a high growth rate in the demand for electricity has a great interest in reducing it, without loss of economic output, so as to minimise the cost of investment in new generating plant. Experience (in Jamaica) suggests that it would be cost-effective to undertake the effort involved in gathering data on the end use of energy, and in planning and implementing DSM programmes. A regional energy programme should also aim, among other things, at providing governments with assistance in doing so.

1.1.3 Renewable Energy Technology

9. RET include grid-connected renewable power (e.g. wind, biomass, small hydro), renewable rural electrification (e.g. photovoltaics), and solar water heating. RET is particularly pertinent to developing countries, where climatic conditions, such as sunlight, and infrastructure arrangements favour its expanded use. Thus, some would argue that Caribbean countries could leapfrog across the entire stage of energy sources to a RET development path. The irony of the situation, however, is that while the more significant opportunities for utilising RET now lie heavily in the developing countries, it is the developed countries that have access to the technology and financial resources to utilise renewable energy sources. Few of the governments in the Caribbean region have developed policies to promote the use of RET, or have even assessed their renewable resources; and it is the aim of the proposed project to provide the means of doing so.
10. An important characteristic of RET is that there are high investment costs because the fuel equivalent for the life cycle of the system is essentially purchased at one time (i.e., fuel costs are negligible). While RET have maintenance and other operating costs, they do tend to be more capital intensive than most non-renewable options. This characteristic, together with the usually large existing foreign debts and high prevailing rates of interest in developing

countries, makes access to investment capital an essential requirement for the widespread use of RET systems. The multilateral lending agencies normally provide capital for large energy projects, and by extension, exercise the ability to influence electricity sector planning in developing countries. Hence, institutions such as the World Bank and the Inter-American Development Bank (IDB) are often identified as important implementing agencies for RET dispersion. The World Bank, in particular, provides approximately 70% of the capital for energy projects from multilateral lending sources, and so it plays a major role in determining the types of energy projects that will be developed. Overall, the important point regarding funding is not the availability of financing *per se* but access to it by developers. Commercial banks are normally willing to finance RE investment projects as long as bank requirements are met and the bank is convinced that the technologies work reliably. Therefore, the challenge is to formulate and present bankable projects.

2. RATIONALE AND OBJECTIVES

2.1 RATIONALE

11. There exists a significant potential to exploit renewable energy sources in the Caribbean. However, the utilisation of these possibilities has been relatively unimportant until now. It is assumed that in the absence of the proposed project the situation will continue to be similar. This under-exploitation of the renewable energy potential is mainly due to the presence of various barriers.
12. Understanding prevailing barriers to renewable energy use and implementing measures to overcome them are the major challenges to achieving a low emissions future for electricity power.
13. It was assumed at the outset of the PDF project that the principal barriers to renewable energy in the Caribbean are related to policy, finance, human and institutional capacities and awareness and information. All these barriers are interrelated and cannot be removed separately. The barrier assessment carried out during the PDF phase revealed that within the four categories mentioned, the most significant are the following:

<p><u>Policy related barriers</u></p> <ul style="list-style-type: none"> ▪ Lack of commitment on the part of governments; ▪ Lack of human resources for overcoming these defects; ▪ Lack of interest and commitment of utilities; and ▪ Discriminating taxation of RE products and other financial disincentives for RE technologies <p>(Activities to remove barriers at policy level are closely linked to those in the financing sector and partly overlapping)</p>
<p><u>Barriers related to RE finance</u></p> <ul style="list-style-type: none"> ▪ Insufficient acceptance of RE; ▪ Lack of project developers
<p><u>Barriers related to human and institutional capacities</u></p> <ul style="list-style-type: none"> ▪ The existing capacity building activities and opportunities in RE are scattered and fragmented in the Caribbean region. Existing opportunities lack continuation, regional co-ordination and possibly integration; and ▪ There are few RE training opportunities in the region for officers/decision makers, technicians of ministries, utilities and local industry. Training opportunities offered to this group are often “donor driven” and not sustainable, and do not reflect priority needs (energy policy, project development, formulating bankable projects)

Awareness and information barriers

- The lack of awareness of and confidence in the technology is a key barrier to the commercial application of RE technologies. A critical number of key persons is needed to be aware of RE, for the technologies and strategies to become accepted by society;
- Most decision-makers would prefer to actually see functioning demonstration projects before investing in RE technologies;
- Insufficient availability and management of relevant energy data. Strengthening and improving the existing Energy Information System in the Caribbean is crucial for the success of any regional energy project in general, and for RE projects in particular; and,
- Lack of systematic RE resource assessment.

2.2 OBJECTIVES

14. The global environmental objective of the proposed project is to remove barriers to the increased use of renewable energies in the Caribbean thus reducing its dependence on fossil fuels and contributing to the reduction of greenhouse gas emissions. The project is consistent with the GEF Operational Strategy, in particular with Operational Program No. 6 aiming at promoting the adoption of RE by removing barriers and reducing implementation costs.
15. An investment of US\$ 10 million in RE projects would result in the avoidance of 35,000 t/annum of CO₂ for Wind, and 17,000 t/annum in the case of PV/Hydro. The avoidance of 680,000 t/annum would be achieved if the present level of RE-based electricity generation of 2% could be raised to 5%. If, as a result of barrier removal activities, renewable energy use increased from the current 2% of commercial electricity generation to 5% by 2015, some 680,000 tons of CO₂ emissions would be avoided annually. This is a realistic expectation taking into account the commercial potential of renewable energy in the Caribbean.
16. Apart from reducing GHG emissions, the project has the following development objectives:
 - Establish the foundation for a sustainable renewable energy industry; and
 - Create a framework under which regional and national renewable energy projects are mutually supportive.

3. PROJECT ACTIVITIES AND EXPECTED RESULTS

17. As shown in the project timetable in Figure 1, project activities designed to achieve the objectives are divided into four groups as follows:
 - Supporting the implementation of policies, legislation and regulations that create an enabling environment for renewable energy development;
 - Demonstrating innovative financing mechanisms for renewable energy products and projects and building the capacity of financial institutions and renewable energy firms in their application;
 - Building the capacity of selected players in the renewable energy field; and
 - Putting in place an improved regional renewable energy information network.

3.1 ENABLING ENVIRONMENT FOR RENEWABLE ENERGY DEVELOPMENT

18. This component contains activities to remove the policy barriers to use of renewable energy in the Caribbean. Although the situation varies between countries, the main barrier found in most of the countries is the lack of awareness among political decision-makers of the potential contribution of RE to national development objectives and of the actions needed to promote it. The ideal situation for each country would be to have a stated energy policy based on each country's capacity to prepare energy policies and strategies. The specific policies concerning RE would then be integrated into this overall policy framework.
19. Since the main barrier found is the lack of capacity for defining and implementing energy policies, the strategies recommended aim at providing or enhancing that capacity. They are:
- Establish a regional Policy Development Advisory Unit to consult with and advise individual governments on the development of their energy policy;
 - Appoint within each country a National Energy Policy Advisory Committee, to assist the government in the formulation and implementation of energy policy by assembling the best technical expertise available; and
 - Develop, within the department responsible for energy in each country, policy planning and implementation skills (this issue is dealt in Chapter 3.3 related to capacity development).
20. Successful implementation will involve appropriate financial and technical resources, appropriate awareness of decision-makers, and active involvement of the private sector and other stakeholders. It is important to emphasise that renewable energy policy must be an integral part of general energy policy. General energy policy is considered the project baseline, and GEF support is requested for the incremental part of it related specifically to renewable energy policy.

3.1.1 Establishment of a Policy Development Advisory Unit (Activity 1.1)

21. In view of the low level of capability found among the member countries of the project, it is not viable to recommend a list of policy instruments that the countries ought to have in common. The most effective approach would be to establish a Policy Development Advisory Unit by means of which each participating government could be assisted in initiating coherent policies to promote RE according to its own individual demands and needs. The services which governments need to be provided include:
- Review and development of appropriate energy policy;
 - Identification and removal of taxation and other disincentives to RE where they exist;
 - Review and assistance in developing appropriate energy legislation;
 - Assessment of RE resources;
 - Conducting of Energy End Use surveys;
 - Preliminary planning of DSM projects;
 - Conducting and evaluation of pre-feasibility and feasibility studies in RE projects;
 - Preparation of project documents;

- Negotiation of Power Purchase Agreements with utilities;
- Assisting utilities to establish Integrated Resource Planning.
- Assessment of the impact of DSM and RE on local environment and on greenhouse gas emissions;
- Assessment of the social and environmental impact of fossil fuel use, so as to give a fair valuation to RE projects; and,
- Preparation of energy policy documents.

22. This Policy Development Advisory Unit will also function as the overall Project Management Unit (PMU) and it will be attached to the executing agency of the programme, CARICOM. A full-time professional in the field of energy policy with strong background in financing would need to be recruited for a period of 5 years, to administer the Advisory Unit. Depending on the person chosen, he might be able to provide many of the services himself, but would also need to administer contracts for the provision of others. The service would operate in response to requests from participating governments as well as private developers.

3.1.2 Appoint a National Policy Advisory Committee (Activity 1.2)

23. In addition to a central consulting Policy Development Advisory Unit, each participating territory will appoint a National Energy Policy Advisory Committee to advise the government on such matters as the priorities and targets to be set for EE and the use of RE, as well as on fair pricing for electricity generated from RE sources.
24. The appointment of such a committee will bring the best technical expertise available in each country to the assistance of the government and to Ministers who are usually lacking in such technical advice.

3.1.3 Expected Results

25. It is expected that at the end of a five-year period all participating territories would have planned and carried out at least one, and perhaps several RE projects. This would require carrying out the following activities:
- Remove most disincentives against RE;
 - Identify and quantify their principal RE resources for electricity generation;
 - Identify and quantify major end uses of electricity, and future growth of electricity end use services;
 - Set national targets for RE and EE;
 - Integrate RE and EE planning into utility expansion planning;
 - Establish principles for the valuation of avoided environmental impacts; and,
 - Establish PPAs for the purchase of RE-generated electricity by utilities.

3.2 INNOVATIVE FINANCING MECHANISMS FOR RENEWABLE ENERGY PRODUCTS AND PROJECTS

26. This component relates to the financial barriers identified during the PDF phase. It was concluded that rather than lack of financial resources in the region, there was lack of project developers and RE projects are commonly not presented for the consideration of financial institutions. The true nature of financial barriers will be seen only after the barriers related to the lack of project development are removed.

27. RE financing is tied to a bundle of conditions where conditions and solutions are interrelated. Conditions and means on the other hand are also strongly related to other issues of the present study like political and legal barriers, awareness and capacity problems. The main tasks needed to facilitate financing of RE are considered to be the following:

<p>Create the appropriate environment to permit project developers to come forward</p> <ul style="list-style-type: none"> ▪ Eliminate barriers for Independent Power Producers (IPPs); ▪ Carry out resource assessments and project identification; ▪ Carry out pre-feasibility studies to demonstrate project opportunities; ▪ Carry out integrated electricity planning to show how RE fits into the medium and long-term energy strategy of the country; ▪ Carry out awareness and information seminars to promote ideas, know how and RE investment opportunities; ▪ Carry out realistic studies for the increased demand of SWHS; ▪ Develop RE business development skills; ▪ Implement demonstration plants or identify appropriate operating projects in comparable countries; ▪ Provide tax incentives for RE producers; and ▪ Facilitate equity co-financing
<p>Increase attractiveness of RE investments</p> <ul style="list-style-type: none"> ▪ Eliminate discriminating regulations and practices for RE which still favour conventional energies (tax and duty advantages for fuels and equipment for conventional, subsidies on electric tariffs); ▪ Reduce costs by optimising project designs with respect to capacity, nominal/real energy output, demand, location, etc.; ▪ Evaluate avoided cost principles and least cost capacity planning criteria used by the utilities with respect to discriminating practices; ▪ Evaluate existing general and sector investment incentives which could also be applicable to RE projects; ▪ Consider external cost of conventional and external benefits of RE, subsidising/buying down incremental cost of RE; ▪ Reduce cost by increasing the number of similar projects and by increasing the market for RE products; ▪ Provide grants to buy down investment cost
<p>Reduce risks of RE investments</p> <ul style="list-style-type: none"> ▪ Use standardised equipment with quality/efficiency certificates; ▪ Transfer technologies from most experienced suppliers; ▪ Arrange joint ventures with manufacturers or BOT contracts with a sufficient long period of operation by the manufacturer; ▪ In PPAs agree long-term tariffs and tariffs related to foreign exchange rates; ▪ Seek Government guarantees for long term loans; and ▪ Develop guarantee instruments
<p>Concentrate on RE mainstream technologies and applications</p> <ul style="list-style-type: none"> ▪ Identify main common RE resources in the Caribbean countries in order to facilitate technology transfer, equipment supply, training, maintenance, etc., and make it more efficient; and ▪ Identify main common applications in the Caribbean countries to facilitate project development with respect to political, legal, institutional, economic and financing aspects
<p>Create special financing lines for RE projects</p> <ul style="list-style-type: none"> ▪ Provide regional financing lines to cover medium size projects; and ▪ Provide the appropriate regional/national institutional set-up and know-how to manage this financing.

28. The approach chosen to remove financial barriers consists of three stages. First, a pipeline of projects will be identified. This needs to be done together with utilities, IPPs and

other potential project developers. Second, the needed institutional set-up for financing the demonstration projects must be established. Third, the actual projects will be developed and financed.

3.2.1 Identify and Define a Pipeline of Demonstration Projects (Activity 2.1)

29. The pipeline of demonstration projects with investment requirements of approximately US\$ 10 million will be developed for the purpose of enhancing the demand for RE finance in the region. It is important to develop this activity together with potential project developers, including utilities and IPPs, in order to ensure that the projects are viable rather than academic case studies. Important tasks within this activity are resource assessments to guarantee adequate energy resources which affect the viability of the projects; prefeasibility studies to narrow down the possible project portfolio; and feasibility studies and project design of the selected projects. Regarding the various renewable energy technologies, the project will concentrate on those technologies that have the widest possibility for duplication and strong potential to reduce GHG emissions. The final technology mix will be decided during the project and in close co-operation with the project developers. It is expected to consist of all or some of the following RET:

- (i) grid-connected renewable power (e.g. wind, biomass, small hydro),
- (ii) renewable rural electrification (e.g. photovoltaics), and
- (iii) solar water heating.

30. The costs of feasibility studies and project designs – and possibly the prefeasibility studies – form part of project costs and funding for them may be given on a contingent grant basis. In the event that projects will be actually developed, these grants will be reimbursed. However, if the project does not prove viable the funds are considered non-reimbursable grants. The details of these mechanisms will be designed in the activity 2.2.

3.2.2 Establish an Institutional Set-up for Finance (Activity 2.2)

31. This component will create the institutional set-up to provide the needed financial instruments and support, first to the demonstration projects and further on to RE projects in general. It is important to develop the activity together with existing financial institutions, especially with the Caribbean Development Bank, to provide expertise in the management of the resources and to guarantee the sustainability of the mechanisms after project termination. This activity will be carried out following GEF guidelines related to private sector participation in GEF projects, especially as they refer to prefeasibility studies and the use of non-grant financing instruments. The administration and the terms of return for the proposed guarantee fund will be spelled out specifically prior to GEF Secretariat endorsement. It is thought that cash transfer and later reimbursement of the guarantee funds could be substituted by an “instrument of commitment” issued by the GEF Trustee. Relevant performance monitoring procedures and the circumstances under which “lack of performance” leading to release of the funds would be defined at the same time.

3.2.3 Conduct Demonstration Projects (Activity 2.3)

32. The selected demonstration projects will be carried out as normal investment projects. The main sources of finance are equity capital from project promoters and loans from commercial and/or development finance institutions like the Caribbean Development Bank. GEF will help remove the incremental risks by using selected non-grant instruments, such as contingent grants for prefeasibility studies or partial loan guarantees to cover specific risks. The design of these instruments will be done within activity 2.2. The project will carefully monitor and evaluate the technical, financial and environmental performance of the projects to maximise the lessons learned from them.

3.2.4 Expected Results

33. The Expected Results of Activities 2 are a number of demonstration projects. Because of the different scales involved in the various RET, under this project for each RET, the capital cost per unit, of mode of operation (off-grid or grid-connected) and the dissemination approach concerned will vary widely. It is expected that by the end of the project some US\$ 10 million will have been invested in successful renewable energy projects in various Caribbean countries through the financing component. These projects will demonstrate the commercial viability of renewable energy in selected applications, such as solar water heaters, wind farms or rural PV electrification and will induce the necessary demand for and supply of financial resources for RE projects on a sustainable basis.

3.3 CAPACITY BUILDING IN THE RENEWABLE ENERGY FIELD

34. One of the main barriers to renewable energy in the Caribbean is the lack of capacity in various areas that are critical to further renewable energy development. This is evident particularly in policy development and its implementation, in technology development, equipment design, manufacturing and building design, and in business development.
35. Therefore, the task of the capacity-building module is to propose project activities that could help overcome the barriers related to this subject. In doing so, one must not forget that the best way to overcome the barriers to establish a sound business environment in the Region which enables and promotes private business in Renewable Energy Technologies (RET). Capacity-building and awareness/information problems can be overcome once a sound business environment is established. Capacity building programmes and awareness/information campaigns without a sound business environment for RET are an ineffective use of funds and effort, as they can only support but not replace market drive. Past training programs for RET without a realistic chance for a job opportunity afterwards have even proven to be counterproductive as they lead to a heightened level of disappointment. The capacity building programs must target different kinds of key players in the field of RE development, including project developers, financiers, engineers and technicians, government policy makers and planners, utilities staff, students and craftsmen, etc. The subjects of capacity building should deal with various aspects (both human resources and physical resources) in the area of RE including appropriate policy and financing mechanisms, renewable energy resource assessment, project development approaches, equipment design, installation and servicing, etc., using different kinds of teaching/lecturing such as summer

schools, workshops, and post – graduate courses. To achieve this result, the capacity building program will have to deal with many different kind of organisations at all levels of education and advanced training spread all over the Region .

36. In addition, future activities in the Region should relate to the Capacity Development Initiative (CDI), an international Strategic Partnership between UNDP and the GEF Secretariat, which was initiated in October 1999. The purpose of this partnership is to produce a comprehensive approach to developing the capacities needed at the country level to meet the challenges of global environmental action. Results of this initiative should be included in project design and implementation as they become available.
37. The review of documents and country visits during the PDF phase revealed that there exist well-established institutions for capacity building in the region at all required levels. The general level of academic and non-academic training possibilities is very good compared with most other regions in the world.³ The main issue is that existing activities and opportunities are scattered and fragmented in the region. They lack continuity, regional co-ordination and possible integration.
38. The long-term objective is that RETs be considered as viable technology options as compared to conventional energy technologies and that RET applications are developed within a sound business environment. With respect to the capacity building area, the objectives are different depending on the various stakeholders/key players:

Ministries: They should be enabled to develop strategies for the integration of RET into national development plans, develop energy policies and to be able to implement them through necessary measures.
Utilities: They should be enabled to assess and evaluate RETs and should have the technical and economic knowledge to integrate them into the national energy system.
Private business people/entrepreneurs/Banking sector: They should be able to develop business plans for RETs and should be enabled to prepare bankable documents. The banking sector should be enabled to evaluate RET project proposals and if necessary to receive assistance in risk assessment and project evaluation.
Training institutions: In the long run, when the RET market is developed in the Region, they should be able to offer all necessary skills at the various levels (technicians, under-graduate/post-graduate and advanced training).

39. To overcome the main barriers identified above, a regional as opposed to a national concept based on identified priorities is necessary to improve the capacity building situation. The improvement in capacity has to occur at the various levels of stakeholders/key players which are the target groups of the capacity building project component. It is proposed that the capacity building barriers first be addressed through the Planning Workshop, followed by execution of other capacity building activities described in this section.

3.3.1 Conduct a Planning Workshop for Capacity Building (Activity 3.1)

40. To optimise the dimensions of the capacity building module and to maximise the use of available funds, the exact design of an appropriate structure for the necessary capacity building activities and the distribution of tasks can only be determined in a Planning Workshop. Conducted prior to Activities 3.2, 3.3, and 3.4, this Planning Workshop will involve all institutions and key stakeholders in the design and optimisation of the capacity building approach, including who is going to develop what kind of capacity and who is

³ For a detailed review, see the documents mentioned in footnote 1.

offering what kind of service and to whom, etc. The regional workshop should be prepared through national meetings summarising national needs. These national meetings would be organised by the National Focal Point (NFP) of the CEIS, with logistical and technical support from CEIS.

41. After comparing the possible list of activities with the priority needs from the assessment, and considering available funds, the following list of activities of highest and high priority has been prepared. This list of activities includes possible activities that will have to be defined and endorsed by the workshop, and forms an outline of the basic concept of the structure, the approximate distribution of responsibilities, and necessary networking among institutions. The following list of activities will serve as a foundation for detailed discussion and planning at the Planning Workshop.

<p>List of activities with highest priority:</p> <ol style="list-style-type: none"> 1. Support to CARILEC and other institutions to train utility staff and staff from related ministries in assessing and evaluating RET; 2. Support to the CTCS of CDB to offer short-term consultancy services in assessing and evaluating technology transfer of RET in the Region; and, 3. Support to CERMES and other institutions to offer short courses on SWH particularly for hotels and related services.
<p>List of activities with high priority:</p> <ol style="list-style-type: none"> 4. Support to the UTECH in repositioning the Energy Centre and support to other universities in offering basic and optional classes in RET subjects; 5. Support to HEART and the Samuel Jackman Prescod Polytechnics in offering training in SWH installation and maintenance and basic installation of PV systems; 6. Support to the UWI St. Augustine and Cave Hill initiative to train school teachers in RET; 7. Support to the Energy Laboratory in Suriname to start up their hydropower Laboratory; and, 8. Support to ministerial and utility staff to participate in the UWI master course on energy management or other master courses on RET.

42. As mentioned above, the exact design of an appropriate structure for the necessary capacity building activities and the distribution of tasks can only be determined in a joint planning workshop. All relevant institutions and key stakeholders will participate in the design and optimisation of the capacity building programme structure.

3.3.2 Training of Utility and Ministry staff (Activity 3.2)

43. The most important capacity need identified is the one related to the capacity of the ministerial staff and the staff of the utilities to assess and evaluate RE related projects. It is targeted to the senior staff of utilities and senior staff of planning ministries. In the long run the utilities should be enabled to design programmes in such a way as to allow them to integrate RET into their systems.
44. As mentioned above the utilities together with the energy agencies/ministries in the Region play the most important role and decide how RET will be included in the future energy mix of the countries. For most of the staff in utilities the knowledge about RET is quite general, only a very few persons having in-depth knowledge. Particular practical knowledge about the possibilities and the problems of integrating RET into the national grid is lacking and is one of the reasons for the lack of advancement in RET in the Region.

45. Selected managers, engineers of various departments of a utility in a country and senior planning staff of the energy ministry of the same country will participate jointly in courses/workshops/training offered in the Region. This will encourage a common approach and may overcome existing communication problems among ministries and utilities. Although much emphasis from the participating countries is on wind power, the capacity building measures will have to strengthen technical and managerial capacity of the staff of utilities in order to deal with other RET as well, including hydropower, solar energy or biomass.
46. To improve understanding of RET among utility personnel, discussions among utility staff of various utilities are considered most important. Some utilities in the region, like KODELA in Curacao or EDF in the French Antilles, do have their own experience with RET integrated into their grid. Meetings/workshops with them or with utilities outside the region, such as Europe, where wind power contributes in some utilities up to 20 percent, could help to overcome information deficits and help to clarify current perceptions about RET. CARILEC may assist the facilitation of such an exchange among utilities.
47. CARILEC, UWI, OLADE, UTECH, utilities in the Region and from Europe and the US, wind power promoters in Europe and the US, as well as wind power plant producers will be the principal partners in this activity. Around 2 workshops a year distributed in the Region will be organised. These workshops will concentrate on wind power contributions to the national electricity grid.
48. CARILEC already offers some training workshops to their utilities. RET-related subjects still have to be included. OLADE may also offer workshops on this topic. UWI, CERMES and UTECH may assist. Many international training institutions offer such short term training courses and workshops. The location of the workshops and selected partners for the execution of the workshop should be planned at the start-up workshop mentioned above.

3.3.3 Establish Short-term Consultancies to Assess Technology Transfer (Activity 3.3)

49. This activity will offer short term consultancy service to private companies, utilities, ministries, RET manufactures and local banks through experts from the region and, if required, international experts. The consultancies will cover all relevant technical and economic questions in assessing and evaluating RETs, enabling project promoters to develop bankable project documents and local banks to evaluate them and to do adequate risk assessments.
50. The key partners in this activity are the CTCS and regional and international experts on RET. The CTCS is a well-established service offered by CDB to any institution in the Region which has technical or managerial questions and needs short term support to clarify or solve a particular problem. CTCS has access to local and regional expertise, not in-house expertise. They arrange for local or regional expertise under the guidance of the Project Management Unit that will be responsible for the provision of all consultancies, be it local, regional or international. The CTCS can serve as an existing and experienced instrument for regional consultancy services which will be complemented by international expertise. Examples might be a wind resource assessment, support for a local bank in evaluating a project proposal, answering particular questions or assisting in evaluation options.

51. It is estimated that around 10 requests should be served each year (the exact figure to be determined in the planning workshop). Priority areas are: assessing possible wind park locations and assessing SWH systems in hotels. It is felt that there is an urgent need for regional technical assistance service which can help utilities, ministries, private entrepreneurs and local banks to deal with specific RET questions. Conditions of the CTCS service (fees, maximum duration of service) and the subjects within RET which should be dealt with (within the given budget constraints) will be determined in the planning workshop.

3.3.4 Offer Short Courses on Solar Water Heaters (Activity 3.4)

52. This activity is targeted to hotels and hotel associations and utilities with an objective to introduce SWH in hotels as part of a DSM programme. The DSM programme in Jamaica is currently evaluating the impact of SWH on the national grid. Evaluations of SWH and their contribution in Barbados should be available through CERMES. Once these results are available, the DSM unit of Jamaica Power Service (JPS) in cooperation with CERMES and a local solar water manufacturer could offer training course/workshops to hotel managers/engineers and representatives of hotels associations in starting a regional SWH programme.
53. The primary partners are CERMES, DSM unit of JPS Co., Hotel associations, SWH manufacturers and international partners. It is estimated that two workshops need to be organised per year. Location of workshops and the selected partners for the execution of the workshops should be planned in the start-up workshop mentioned above.

3.3.5 Expected Results

54. The expected results of the capacity building component are:
- Staff of utility companies will be strengthened in their capability to evaluate and assess RET;
 - Questions from the target group can be answered correctly and quickly and an assessment of RET options can be carried out to determine whether an in-depth feasibility study is justified;
 - Local banks can be assisted and trained in evaluating RET project proposals; and
 - A regional initiative to introduce SWH into the hotel business of the Region will be commenced.

3.4 IMPROVED REGIONAL RENEWABLE ENERGY INFORMATION NETWORK

3.4.1 Strengthening of the Existing National Renewable Energy Information and Awareness Networks (Activity 4.1)

55. This activity will strengthen institutional support to and linkages with existing national networks such as sustainable development councils, climate change committees and

appropriate national energy committees. The project will also establish or strengthen national energy agencies through the following activities:

- Training of energy officers, dissemination of information packages regarding Renewable Energy;
- Short term training in renewable energy for relevant stakeholders;
- Provision of relevant data at the national level for implementation of the RE decision model;
- Provision of short- term consultancies for persons/agencies involved in the development of cost effective Renewable Energy projects; and
- Upgrading of facilities at the National Focal Points.

It is important to note that while 3.2 and 3.3. concentrate on Capacity Building, this activity mainly concentrates on building awareness and providing information. An overlapping of activities will have to be avoided during the process of activity planning during the project implementation.

56. The CEIS National Focal Points are responsible for local quality control of the base data, which is generated and disseminated at the local level by the CEIS network. It is therefore important that adequate resources and a cadre of skilled personnel are in place at each Focal Point.

3.4.2 Strengthening of the Regional Renewable Energy Networks (Activity 4.2)

57. The regional renewable energy networks will be strengthened through three specific actions: improving information exchange and access to information resources of the CEIS, CERMES, CARILAC and CSES; developing appropriate regional data sets for the establishment of a RE decision model; and establishing a regional collaboration framework on which to facilitate the development of regional projects and programmes.

Improving information exchange and access to the resources of the CEIS, CERMES, CARILEC, and CSES.

58. There are two major agencies involved on a full-time basis in the collection and dissemination of information on renewable energy. They are the Caribbean Energy Information System (CEIS) and the Caribbean Electric Utility Services Corporation (CARILEC). There are other professional associations involved in Renewable Energy and to which these two major networks should be linked. These include the Caribbean Solar Energy Society (CSES) and CERMES.
59. This activity will establish a virtual storefront where all existing information on Renewable Energy will be linked via the Internet into one large Renewable Energy access point. While still linked globally, each agency will be a node on the "virtual Internet information agency" having its own virtual storefront.
60. The Internet is currently the largest information network in the world (800 million pages and growing) and will eventually include the largest volume of networked renewable energy information available in the region. The regional existence of an information

exchange database that has been largely created (and physically located) outside the region is part of the new concept of "virtual information resources". The ease of access and exchange of information at a regional or national level is comparable to or exceeds the access to information networks existing physically on a national or regional basis. The current practice of establishing a regional or national stamp to this global information network is usually to simply establish a small or big signature web page (storefront) to which a contributor's information is accessible nationally or internationally. This virtual regional facility can point to other global or national nodes (storefronts) as well as global nodes of national or regional interest.

Developing appropriate regional data sets for the establishment of a RE decision model

61. This activity will serve to strengthen the analytical capability of the energy Focal Points for decision making both at the macro and at micro levels. It will assist energy personnel in predicting how consumers will behave under different scenarios as they relate to appropriate RE policies.
62. Work has already begun on this by CEIS and the Faculty of Engineering at the University of the West Indies, but lack of funding has hampered its development. Specific activities include:
 - The employment of appropriate technical expertise;
 - The refining and upgrading of the existing draft model;
 - The development of software component for the model;
 - The co-ordination and setting up of country technical bases; and
 - The conducting of training associated with the implementing of this activity.

Establishing a regional collaboration framework on which to facilitate the development of regional projects and programmes

63. This activity will promote meetings using available technology as far as possible and including virtual talk shops, instant messaging, list servers as well as the UWI teleconferencing resources to link these agencies further. The standard type of regional meetings will also be continued.
64. The population of the countries in the region is small compared to the rest of the world. There is therefore a benefit for regional cooperation and regional delivery of some energy related activities. Many of the Renewable Energy related agencies/groups have already been linked to the major networks. Some have never been officially linked prior to this project. This can be effective in delivering renewable energy information/awareness if they are linked (if only virtually) using available technology and with each contributing their resources to the whole. These agencies have significant information resources that need to be accessed by a geographically diverse clientele. Accessibility will be key to achieving this. Accurate data to support informed decision making is also in need of improvement in the region and the decision model should enhance this activity.

3.4.3 Establishing a Regional Information and Awareness Programme (Activity 4.3)

65. Meetings carried in all of the participating agencies suggest that awareness of most renewable energy systems is low. This is also supported by the survey that was conducted during the development of this project proposal. It is generally believed that awareness is pivotal in the securing of public and government support for developmental projects. The CEIS and other awareness agencies do not have the funds to deliver these levels of activities without assistance. To overcome these barriers, the following activities will be implemented:
- The preparation and delivery of regional renewable energy awareness tools such as training materials for workshops, documentaries, videos and other information packages targeted at investors, the institutions, students, other consumers;
 - The sponsorship of a series of site visits and attachments to demonstration sites by regional policy makers, technicians and other relevant persons; and
 - The delivery of a series of targeted RE Awareness workshops/seminars for investors, policy makers and trainers in renewable energy.

66. A further breakdown of the activities by target groups is as follows:

<p>For Policy Makers</p> <ul style="list-style-type: none"> ▪ One 3 day workshop on planning and developing RE projects. This should include project design, use of decision models and use of RE data for project planning, the economics of RE project development. ▪ Site visits to successful RE Projects to give hands-on experience in the operation of these projects. <p>2. For the Private Sector</p> <ul style="list-style-type: none"> ▪ Three one-day workshops in three territories on “Opportunities for Investment in Re Projects in the region” ▪ Development of a guide to investment in RE in the region for persons unable to attend workshops. <p>3. For Trainers in RE</p> <ul style="list-style-type: none"> ▪ Two 2-day workshops on methods of delivering RE information. One workshop should target secondary school teachers and one target tertiary institution teachers. <p>4. For the General Public</p> <ul style="list-style-type: none"> ▪ Regional videos should be developed for dissemination throughout the region on the potential and actual use of the major RE categories of solar, wind, hydro, biomass and geothermal energy. Each video could be approximately 10 mins long. <p>5. For Students</p> <ul style="list-style-type: none"> ▪ Information packages should be developed to target students at the primary and secondary level and educate them about the use of RE and its applicability to the Caribbean Region.
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3.4.4 Establishing a Virtual Regional Demonstration Centre (Activity 4.4)

67. Detailed information on successful regional RE projects is not readily available. Geography often forms a barrier to observing the development of these successful projects. Further, language barriers are present in the region. People in the region in the process of developing RE projects are often unaware of details of the development of successful (or unsuccessful) projects which could be used as a guide to future project development. This activity will therefore:
- Establish a virtual demonstration centre as a web page with links to the Regional RE Web page and maintained by CEIS. The web pages should be in English /French /Spanish to be useful to all countries in the region, and also outside the region.;

- Provide detailed information on the planning process and execution of a number of successful RE projects in the region, including from outside the immediate region (e.g., Mexico, Central America). All categories of projects will be documented including wind, solar PV, biomass, hydropower and geothermal. Collate and convert this information on successful regional RE projects to digital format where necessary;
- Publish articles which demonstrate the cost-effectiveness of RE systems in the region and beyond;
- Provide links to regional renewable energy expertise in areas relevant to the region capable of providing consultancy services and training; and
- Review the viability of internationally sourced renewable energy technology developments relevant to the region and adapt international technologies to local/regional conditions, and provide examples of unsuccessful RE projects as well to establish lessons learned from similar projects (e.g. from REAP, Regional Energy Action Plan conducted in the 1980's and other international programmes such as those in the field of PV systems).

3.4.5 Expected Outputs

68. The information/awareness component is expected to produce the following outputs:

- Improved RE information infrastructure at the national level;
- Improved capability in the delivery of RE at the national level;
- Improved decision making regarding RE at the national level;
- Greater availability of renewable energy information;
- One virtual location for all regional renewable energy information;
- Accelerated development of regional renewable energy programmes;
- Greater capacity to facilitate regional renewable energy meetings;
- Increased public awareness and participation in the CREDP project;
- Greater and easier access to information on successful RE projects;
- Accelerated development of RE projects; and
- Greater accessibility of RE experts in the region.

4. RISKS AND SUSTAINABILITY

69. The following risks need careful monitoring during project implementation:

- Since GEF support is granted only to country-driven projects the CREDP can only be successful if governments of participating countries show strong and continuous commitment to the project;
- Project may not catalyse sufficient private sector participation to ensure local and regional supply of RE equipment and associated services;
- Interest rates may increase and may constrain RE investments; and
- Drought or low-wind conditions could reduce financial viability of RE projects.

5. STAKEHOLDER PARTICIPATION AND IMPLEMENTATION ARRANGEMENTS

70. CARICOM will be the executing agency of the project. The executing agency manages the project and is accountable to UNDP for the effective use of the resources. A special Project Management Unit (PMU) will be established within CARICOM to implement the project on a day-by-day basis. PMU will provide professional guidance to both project holders and governments during the period of execution.

71. A Steering Committee will be established to oversee project execution. It will provide oversight in relation to the establishment of the PMU, monitor and provide oversight of the PMU after its establishment, guide the implementation of the work plan, review the budget and address specific implementation problems. The Steering Committee will consist of the following members:

- CARICOM (Chair) Minister with responsibility of energy matters;
- UNDP;
- OECS representative;
- Non-OECS representative;
- CARILEC;
- University representative;
- NGO representative;
- PMU (*ex officio*);
- CDB (*ex officio*); and
- CEIS (*ex officio*)

72. A separate fund manager will manage the investment fund including the GEF guarantees. It was decided that the Caribbean Development Bank (CDB) would be best positioned to act as the fund manager.

73. The implementing agencies for the different project components, for instance those related to capacity building and information, will be decided by the Steering Committee. The following table gives an overview of the role of the various bodies and stakeholders of the project:

Body	Function	Remarks
Steering Committee	Guarantees the accountability of funds	
Fund manager	To manage the TA-fund, the investment fund, the loan guarantee instrument and the GEF contribution. To link local development banks to the programme	This function is best handled by the Caribbean Development Bank, since they enjoy the reputation of properly handling bilateral and multilateral loans
Project Management Unit	To screen project proposals and enhance viability by providing professional guidance to project holders. To link private sector and utilities with CDB and local development banks	This unit should comprise of one full time financing specialist and a pool of short-term technical advisors. This unit needs a lead time of one year on a grant basis prior to loan agreement
CEIS/SRC including focal points	To disseminate project specific experience related to the policy framework and encountered barriers. To generate lessons learnt. To qualify focal points to identify and receive project proposals.	
Governments of the Caribbean	To initiate coherent policies to promote	

	renewable energy. To guarantee loans.	
Private sector and utilities	To invest in viable RE projects	The ultimate responsibility for project identification and implementation must be with this sector

6. INCREMENTAL COSTS AND PROJECT FINANCING

74. The detailed incremental cost analysis is presented in annex A. The technical assistance components of the project will be financed by in-kind and cash contributions from the participating governments and institutions, by external donors and by the GEF. The actual renewable energy investments will be financed by equity provided by investors, by loans from the Caribbean Development Bank (CDB) and from other financial institutions. The GEF will remove incremental risks related to unknown renewable energy technologies by use of non-grant financing tools, e.g. partial guarantees. The details of these mechanisms will be designed together with the CDB in the beginning of the project. The following table summarises the financial structure of the project.

Component, Activity	GEF	Governments Institutions	Other Donors	Investments (loan & eqty)	Total
Policy	150,000	200,000	800,000	-	1,150,000
1.1 Policy Development Advisory Unit (Project Management Unit)	150,000	150,000 (CARICOM)	400,000	-	700,000
1.2 National Policy Advice	-	50,000	400,000	-	450,000
Financing	2,500,000	850,000	500,000	10,000,000	13,850,000
2.1 Pipeline development	400,000	250,000	500,000 (resource assess.)	-	1,150,000
2.2 Financial mechanisms development.	500,000	100,000 (CDB)	-	-	600,000
2.3 Financing RE projects	1,600,000 (non-grant)	500,000 (govt. guar.)	-	10,000,000	12,100,000
Capacity Building	850,000	50,000	-	-	900,000
3.1 Start-up Workshop		50,000			50,000
3.2 Training of utility & govt	250,000	-	-	-	250,000
3.3 RE project evaluation	500,000	-	-	-	500,000
3.4 SWH courses	100,000	-	-	-	100,000
Awareness and Information	576,000	50,000	-	-	626,000
4.1 National strengthening	160,000	50,000 Govt, CARICOM	-	-	210,000
4.2 Regional strengthening	120,000	-	-	-	120,000
4.3 Awareness building	236,000	-	-	-	236,000
4.4 Virtual Demo Centre	60,000	-	-	-	60,000
TOTAL	4,076,000	1,150,000	1,300,000	10,000,000	16,526,000

7. MONITORING, EVALUATION AND DISSEMINATION

75. Effective operational M&E procedures are vital for the success of the project. M&E will enable the project management to monitor project implementation at all times and to take necessary corrective measures at the earliest possible stage. It is essential to:

- set specific milestones (targets, benchmarks) within the defined time frame (see Figure 1 for the project timetable and work schedule);
- incorporate project evaluations/assessments at each phase of the project; and
- establish targets for the next project phase.

76. Monitoring and Evaluation will also be used purposefully to emphasise improved likelihood of project and program success.

LIST OF ANNEXES

Annex A	Incremental Costs
Annex B	Project Design Summary
Annex C	Independent Technical Review
Annex C1	Response to the Independent Technical Review

ANNEX A

Incremental Costs

Broad Development Goal

The broad development goal of the proposed project is to remove the barriers to increased use of renewable energy in the Caribbean thus reducing the Region's dependence on fossil fuels. This will have a positive impact on the countries' balance of payments as well as on their local environment.

Baseline

In the absence of the project, renewable energy sources will contribute only marginally to the energy balance of the Region. As power demand grows and the power sector is increasingly privatised and deregulated, new fossil fuel based power plants will be constructed to satisfy the demand. In spite of abundant renewable resources of energy, such as solar, wind, geothermal and hydro, only about 2% of the commercial electricity are based on these sources.

Global Environmental Objective

The global environmental objective of the project is to mitigate GHG emissions from the use of fossil fuels in the Caribbean by removing barriers to the utilisation of renewable energy.

GEF Alternative Scenario

In the GEF alternative, the barriers related to policy, financing, human and institutional capacities as well as awareness and information are removed in order to unleash the renewable energy potential in the Region. It is expected that if the project is successful, renewable sources of energy can easily contribute some 5% of the Region's commercial electricity by 2015. This would imply annual reductions of CO₂ emissions on the order of 680,000 tons. In addition to regional impact, the project can provide important information and lessons learned, which may be useful in other parts of the world where similar regional approaches can be adopted.

System Boundary

From the geographic point of view, the system boundary is formed by the 16 participating countries from the Caribbean Region. Regarding the various renewable energy technologies, the project wishes to concentrate on those technologies that have the widest possibility for duplication and strong potential to reduce GHG emissions. The final technology mix will be decided during the project and in close co-operation with the project developers. It is expected to consist of all or some of the following RET: grid-connected renewable power (e.g. wind, biomass, small hydro), renewable rural electrification (e.g. photovoltaics) and solar water heating. In order to maintain project focus, the total amount of investments will be limited to und US\$ 10 million.

Domestic Benefits

The principal domestic benefits are related to reduced imports of fossil fuels, improved energy policy-making capacity of the national governments and reduced local environmental impacts from power generation. Towards these benefits the governments and national and regional institutions will contribute US\$ 1,150,000; project developers and investors US\$ 10,000,000; and other donors US\$ 1,300,000.

ANNEX A

Incremental Cost Matrix (in US\$)

Project component/ Activity	Benefits/ Costs	Baseline scenario	Alternative (GEF -) scenario	Increment
1. Enabling Environment for Renewable Energy Development				
Activity 1.1 Establish Policy Development Advisory Unit (acting as Project Management Unit, or PMU)	Global Environmental Benefits	<p>Energy investment planning is mostly done by utilities according to the energy demand increase and least cost planning method.</p> <p>Most energy investments in the region represent free market conditions and happen in conventional non-renewable energy source projects.</p> <p>There is no regional energy policy advisory entity advising governments in formulating, synchronising and implementing a regional renewable energy policy.</p>	<p>A PMU is established and provides professional guidance for RE investors, initiating and screening of project proposals, enhancing their financial viability, assisting investors in securing political support and in identifying financing.</p> <p>PMU initiates RE dialogue between and linking private sector, governments and development banks.</p> <p>PMU support and advise investors in the energy sector to shift energy investment from conventional towards RE-investment;</p>	<p>Setting up the PMU and contributing to operational cost, with the perspective of shifting from being financed by GEF towards a service unit financed by potential investors for RE investment.</p> <p>(Clearinghouse function)</p>
	Domestic Benefits	Insufficient capacity to formulate and implement energy policies	Capacity development in energy policy formulation	Improved overall energy policy environment
	Costs	550,000 (Caricom, Donors)	700,000	150,000
Activity 1.2 Appoint a National Policy Advisory Committee (short term assistance)	Global Environmental Benefits	<p>There are no advisory services for systematic energy planning and RE policy formulation in most of the Caribbean Countries.</p> <p>Ministries are lacking technical advice in promoting RE technologies and formulating RE-related policies.</p> <p>CEIS national Focal Points provide (limited) energy service by giving energy data to CEIS Regional Focal Point for further data processing.</p>	<p>National energy advisory bodies/ energy specialists assist their governments in initiating coherent energy policies with special consideration of RE policy; they advise the governments to create political and economic incentives for RE investments and in initiating the measures to remove discriminating conditions for RE at the national level.</p> <p>They also advise their governments in synchronising RE related efforts at regional level in order to take advantage of synergies.</p>	<p>Governments are aware of RE barriers and advised on barrier removal measures. Government have access to the experience of other Caribbean Countries in the field of RE.</p> <p>RE investment planning become an integrated part of national development planning and sustainable energy development.</p>

Project component/ Activity	Benefits/ Costs	Baseline scenario	Alternative (GEF -) scenario	Increment
	Domestic Benefits	Insufficient capacity to formulate and implement energy policies	Capacity development in energy policy formulation	Improved overall energy policy environment
	Costs	50,000	450,000	400,000 (Other Donors)
2. Innovative Financing Mechanisms for Renewable Energy Products and Projects				
Activity 2.1 Identify and Defined a Pipeline of demonstration projects	Global Environmental Benefits	There are only limited and isolated national efforts to demonstrate RE technologies in a commercial way to potential investors or utilities (e.g. PV system for 'Harrison Cave' in Barbados) but not at regional level.	A pipeline of demonstration projects enables potential investors (e.g. IPP, utilities) and governments to make decisions in favour of RE technologies; RE resource assessment, site evaluations, Pre- and Feasibility Studies, design of demonstration projects.	Investors, utilities and commercial Banks can receive support and technical advice to plan and implement projects that serve as demonstration of RE technology. As a result, RE projects serve as demonstration projects encouraging private investors, utilities and banks to invest increasingly in RET. To achieve this objective a special investment fund for the realisation of demonstration projects is necessary.
	Domestic Benefits	RE resource assessment	RE resource assessment	None
	Costs	750,000	1,150,000	400,000
Activity 2.2 Establish an Institutional Set-up for Finance	Global Environmental Benefits	RE Technologies at commercial scale are not very known to governments, utilities and Banks. There are no RE specific mechanisms or models in place for planning, financing and implementation of RE projects.	Establishment of sustainable institutional set-up for financing of RE projects and of rules and mechanisms at national and regional level to tap financing sources. Execution of market surveys, development of financing models and training of Banks in technology assessment as risk mitigation measure help to establish structures for increased RE development.	Successful RE demonstration projects will be actively promoted for replication at regional level. Identification of a sufficiently large potential demand for RE investment opportunities will create a market for RE projects, products and related services and the basis for increased investment in RE projects.
	Domestic Benefits	Banks finance non-renewable projects	Banks finance RE projects	None
	Costs	100,000	600,000	500,000

Project component/ Activity	Benefits/ Costs	Baseline scenario	Alternative (GEF -) scenario	Increment
Activity 2.3 Conduct Demonstration Projects	Global Environmental Benefits	There is no provision for a specific RE Investment Fund to cover incremental risks resulting from the pilot character of the envisaged RE investment projects.	Establishment of a special RE fund to cover increased risks going along with new technologies in the region, providing concessionary interest rates and a line of RE loans for private sector on non-grant basis (e.g. additional guarantee fund).	Existence of a guaranty instrument or risk fund will encourage investors to enter RE investment reducing the risk for those who invest first in RE projects. Investors invest capital in RE projects which otherwise would have been invested in conventional energy projects. They get offered incentives in order to reduce technological risk at pilot stage as well as cost for RE specific training of operators etc.
	Domestic Benefits	Investments worth US\$ 10 million to non-renewable energy projects.	Investments worth US\$ 10 million to RE projects.	None.
	Costs	10,000,000	12,100,000	2,100,000 (1,600,000 from GEF on a non-grant basis) (500,000 Guarantees from the Governments)
3. Capacity Building in the Renewable Energy Field				
Activity 3.1 Conduct a Planning Workshop for Capacity Building	Global Environmental Benefits	None	None	None
	Domestic Benefits	No clear definition of the capacity building priorities.	Definition of Capacity building priorities in the workshop.	Capacity building priorities defined.
	Costs	0	50,000	50,000 (CEIS, others)
Activity 3.2 Training of Utility and Ministry Staff	Global Environmental Benefits	There are well-established training institutions but only few and scattered RE related training opportunities mostly for students and technicians at universities, colleges and vocational training centres.	Establish training opportunities at national and regional level as well as tapping international RE training opportunities for technical staff members will enhance the willingness to consider RE project (utilities) and to create a favourable political environment (Ministries).	Developing and increasing the capability of technicians of utilities and Ministries in identifying, evaluating and assessing RE projects will increase the national and regional capacity to develop the existing RE resources in a sustainable manner.

Project component/ Activity	Benefits/ Costs	Baseline scenario	Alternative (GEF -) scenario	Increment
	Domestic Benefits	Existing training opportunities for utilities in conventional energy generation.	Training opportunities in RE.	None.
	Costs	0	250,000	250,000
Activity 3.3 Establish Short-Term Consultancies to Assess Technology Transfer	Global Environmental Benefits	Utilities and private investors do not invest in RE project assessment if investment opportunities are uncertain in terms of technical reliability, political support and financial viability.	Potential investors as well as political decision-makers will get offered technical support to prepare investment decisions for RE investment projects.	RE investors get offered consultancy to evaluate the merits and selecting the adequate operating models (BOO, BOT, BOOT etc) as well as legal advice (contracts, IPPs, PPAs), e.g. through CTCS.
	Domestic Benefits	Training in conventional energy	Training in RE	None
	Costs	0	500,000	500,000
Activity 3.4 Offer Short-Courses on Solar Water Heating	Global Environmental Benefits	The Hotel and Tourism Industry are only partly aware of the economics of Solar Water Heating Systems (SWH). Regional and local manufacturers and dealers have a lack of trained personnel for production, installation and after sale service.	Solar Water Heating (SWH) particularly in the Hotel and Tourism Industry represent a considerable potential for electricity and thus cost savings. Potential users of SWH need to become aware of this cost saving potential.	Special training courses and awareness seminars for technicians and commercial users (Hotels) will contribute to introduce and/or increase the utilisation of the Solar Water heating technology thus replacing to certain extent the need for extension of electricity generation capacity.
	Domestic Benefits	None	None	None
	Costs	0	100,000	100,000
4. Improved Regional Renewable Energy Information Network				
Activity 4.1 Strengthening of <u>national</u> RE Information systems (CEIS Nat. Focal Points)	Global Environmental Benefits	CEIS Liaison Officers (Regional and National Focal Points) provide basic energy data collection, but with limited focus on RE.	Strengthening institutional support and linkages of the national energy agencies to existing networks at regional and international level.	The quality (reliability) of energy data provided by the national information systems is decisive for any RE investment projects.
	Domestic Benefits	Conventional energy data collected.	RE energy data collected.	None.
	Costs	50,000	210,000	160,000

Project component/ Activity	Benefits/ Costs	Baseline scenario	Alternative (GEF -) scenario	Increment
Activity 4.2 Strengthening of regional energy networks	Global Environmental Benefits	Several institutions collect, process and store local and regional energy data in parallel and not co-ordinated, e.g. CEIS, CARILEC, CERMES, CSES.	Existing institutions will bundle and co-ordinate the collection and processing of energy data with special focus on RE sources and make them accessible through the internet thus establishing a large RE regional access point. This framework will also facilitate the development of regional RE projects and programmes. There will be one virtual location for RE information for the region.	Any potential RE investors will get RE related information in a one-stop procedure in a one-stop-process from one institution. There will be no need to look further for energy data. This will enable not only investors but also governments and any other institutions to make competent RE related decisions.
	Domestic Benefits	None	None	None
	Costs	0	120,000	120,000
Activity 4.3 Prepare and implement a regional awareness and information program	Global Environmental Benefits	Lack of awareness and information about renewable energy sources and technologies is one of the main barriers for the wider application of RET. There are no regional joint efforts to increase the awareness for RE in the region.	Establishment of a regional information awareness program including preparation and delivery seminars, documentaries, information packages, targeted at investors, policy makers, private sector and end-users.	Public awareness about the potential contribution of RE to the national and regional energy balance will be increased; the public will be sensitised to RE related issues, acceptance of RET and finally, the willingness to invest in RE will be increased.
	Domestic Benefits	None	None	None
	Costs	0	236,000	236,000
Activity 4.4 Establish a Virtual Regional Demonstration Centre	Global Environmental Benefits	There is a lack of knowledge on successful RE projects in the region and outside as reference tool for potential investors, utilities and policy makers.	A virtual regional demonstration centre with technical data and lessons learned will be set up as a web page with links to the regional RE web page and regional institutions involved in RE development. Articles on technological developments, cost effectiveness as well as links to international RE developments will be provided.	This virtual regional demonstration centre will serve mainly as 'toolbox' for investors, utilities and government institutions as reference for successful modelling and implementation of RE projects, for evaluating their impact on national economies and the environment thus helping to prepare RE investment decisions.
	Domestic Benefits	None	None	None
	Costs	0	60,000	60,000

Project component/ Activity	Benefits/ Costs	Baseline scenario	Alternative (GEF -) scenario	Increment
TOTAL				
Global Environmental Benefits	RE remains marginal source of energy, indigenous natural resources remain untapped, CO ₂ and other GHG emissions will continue and rise from extension of generating capacities by means of fossil fuel based power plants.	The present rate of 2% RE portion in the overall regional commercial electricity balance will be increased by the project. Energy investment projects for the extension of generating capacities will increasingly be shifted from conventional fossil-fuel based generation towards RE based generation, resulting in avoidance of CO ₂ emissions.	With a moderate investment volume of approx. US\$ 10 Mil as a starting point, the yearly emission of about 680,000 tons CO ₂ can be avoided.	
Domestic Benefits (local and regional)	Energy investment would happen in conventional energy generation requiring the importation of fuel and dependence on these deliveries, requiring foreign currency expenditure.	Energy investment at national level will take advantage of indigenous energy resources reducing the percentage of fossil fuel based energy generation.	The regional human resource capacity for identification, planning, implementation and operation of RE projects will be increased as will savings from expenditures on fossil fuels. Cost savings from the non-importation of fossil fuels. Creation of jobs in the local and regional industry.	
Costs	11,500,000	16,526,000	5,026,000 GEF GRANT US\$ 2,476,000 GEF NON-GRANT US\$ 1,600,000 OTHERS US\$ 950,000	

ANNEX B
PROJECT PLANNING MATRIX

Project Strategy	Objectively Verifiable Indicators	Means of Verification	Assumptions
Development Goal: Abate CO ₂ emissions from energy use in participating countries	CO ₂ emissions compared to the project baseline	Official statistics National Communications to UNFCCC	Proactive participation of the Governments
Project Purpose: Remove barriers to the use of renewable energy in the Caribbean	Percentage of renewable energy in commercial energy use	Official statistics Project status reports	No significant reduction in international fuel prices The renewable resource base does not change significantly, for example, due to climate change
Component 1: Enabling environment for renewable energy development	National targets for renewable energy defined RE integrated into utility planning Establishment of PPAs for RE projects	Official publications Project status reports	Interest from the part of the utilities
Component 2: Innovative financing mechanisms for renewable energy products and projects	Investment resources leveraged directly by the project Total amount invested in RE projects in the region	Official Publications Reports of the CDB Project status reports	Available investment resources in the region stay at the current level or increase
Component 3: Capacity building in the renewable energy field	Number of participants in different capacity building initiatives related to RE Supply of RE related training in the region	Project status reports Reports of the training institutions Surveys in governments and utilities	Regional training institutions maintain their international competitiveness
Component 4: Improved regional renewable energy framework	Number of users accessing the information system Availability of updated RE information in the region	Project status reports Internet usage counters Surveys	The Internet maintains its strength and freedom as an information source

ANNEX C
STAP ROSTER TECHNICAL REVIEW

Caribbean Renewable Energy Development Programme
GEF Project

STAP roster Independent Technical Review by Gautam S. Dutt, June 26, 2000

1. OVERALL IMPRESSIONS

The project deals with an important area, reducing the barriers to the entry of renewable energy technologies in a region, which is highly dependent on imported fossil fuels. Thus, besides the climate change mitigation aspects, the objectives of this project also serve broad national and development objectives. Parts of the Project Brief Version 3.0 were not formulated. This reviewer has attempted to identify possible problems and suggest solutions in many cases. It is hoped that the criticism is constructive and that it would lead to a successful renewable energy development in the Caribbean.

2. RELEVANCE AND PRIORITY

The project is important and relates to the GEF Operating Program 6: Removing barriers to the use of renewable energy.

3. PROJECT APPROACH

The project approach is excellent. A previous Project Development study evaluated the current status and options for renewable energy in the Caribbean countries and made institutional contacts. This information was used in the preparation of this Project Brief.

4. OBJECTIVES

The project objectives are valid.

There is, however, some confusion as to the *scope*.

One area of confusion is whether the renewable energy projects are intended for *electricity generation or for energy in general*. For instance, the Summary (Item 2 of Project Brief) states: "Currently renewable energy provides less than 2% of the region's commercial *energy*". While total commercial energy consumption is implied here, only commercial electricity is stated elsewhere. For instance, para 15 states the Objectives of increased use of RE use from the current 2% of commercial *electricity* generation to 5% in the future (emphasis added). In Annex A (Incremental Costs), we find that "only about 2% of commercial power generation *will be* based on renewable energy sources (emphasis added). Moreover, this latter case refers to an unstated future date. Further down the same Annex (GEF Alternative Scenario) states "Renewable sources of energy can easily contribute some 5% of the region's *commercial energy* by 2015". This specifies a future date but does not, apparently, limit itself to electricity.

The confusion continues elsewhere in the Project Brief. Sec. 1. Background and Context, para. 1 states that in business-as-usual scenario, renewable energy technologies are likely to provide less than 2% of the region's commercial energy. This is not limited to electricity and no specific future date is specified.

*This reviewer concludes that only renewable **electricity generation** was intended in the project and this should be explicitly stated.*

Another area of confusion in scope, and a related one, is to do with the choice of renewable energy technologies. There is a great variety of renewable energy technologies, and indeed the Final Report of the Project Development Report⁴ identifies “four energy technologies as being of greatest interest to policy makers in the Caribbean. They are according to their potential impact on electricity generation in near future: wind energy, small hydropower systems (SHS), biomass (including bagasse, rice husks, and wood waste) and solar energy (photovoltaic (PV) systems for remote rural sites)”. (Sec. 2.3, p. 17 of report cited in footnote.) The report also mentions “important opportunities for the use of solar energy, in two forms, namely (i) Solar water heating systems (SWHS), and (ii) solar crop drying.

The Project Brief should specify the renewable energy technologies that are likely to be given priority in the proposed project, all the more so since these were identified during a previous GEF PDF report. Moreover, some of the activities to be carried out in the course of the proposed project do depend on the choice of technologies. For instance there is technical expertise in the region in the area of *small hydroelectric generation*. *Wind energy* parks and grid-connected wind power already exists in one of the countries in the project (Jamaica) but other significant installations exist in nearby countries (Curacao, Guadeloupe, Costa Rica, and Mexico) which may serve as demonstration sites for people involved in the project.

Only in Annex A (Incremental Costs) of the Project Brief, under “System Boundary” is there a list of RET: “grid-connected renewable power (e.g. wind, biomass, small hydro), renewable rural electrification (photovoltaics) and solar water heating”. Indeed this list largely coincides (except for solar crop drying) with those RET identified in the PDF report. This reviewer believes that this list of RET should appear in the body of the report, certainly in Sec. 1.1.3.

Can the Objectives be met given the Activities outlined? Here we must keep in mind that the GEF project is not a climate change enabling activity. Moreover, a prior, Project Development phase has already been completed. Furthermore, the proposed project seeks over 4 million dollars in GEF financing (not counting the PDF) and over \$ 12 million in additional resources. The Objectives should include specific goals on GHG mitigation. Indeed, in spite of the confusion in the scope, one may identify a specific objective as increasing the renewable share of electricity generation to 5% in the year 2015 with a 680,000 ton reduction in CO₂ emissions. It is not immediately clear from the Activities described if this goal can be met and how. Most of the Expected Results (Sec. 3.1.3, para 25) are indeed enabling activities, which, by themselves, do not reduce CO₂ emissions. The last stated “Expected Result” which calls for all territories to

⁴ CARIBBEAN RENEWABLE ENERGY DEVELOPMENT PROJECT Final Report Volume I: Barrier Assessment and Project Proposal.

“Have planned and carried out at least one, and perhaps several RE projects” appears to be a reasonable goal in furthering both renewable energy and regional cooperation.

5. BACKGROUND AND JUSTIFICATION

The background and justification for the project are clearly stated in Sections 1 and 2 of the Project Brief, except for the ambiguities mentioned in Sec. 4 of this review, above.

Minor observations:

Para 7 states:

“The pursuit of efficiency in the use of energy (EE), usually in the form of Demand Side Management (DSM) *is a higher priority*, when it comes to meeting increasing electricity demands, than RE, since EE measures can usually be taken immediately and often without major investment, especially at the end-user level. It is a widely known truth that the cheapest kWh is the saved one”. (emphasis added)

Perhaps the document means to say that DSM *should be* a higher priority, considering its potential benefits. However, most countries do not have effective programs, Jamaica being a notable exception. Moreover, deregulation of the power sector often leads to decreased activities in DSM, even when these activities existed prior to deregulation. If deregulation is accompanied by privatisation, then governments often lose power that they might have exercised in promoting DSM.

A discussion on electricity efficiency and DSM is not out of place in a project to promote renewable power generation. This is because such activities can reduce future electricity demand, and the potential for such decrease for a year 2015 time horizon is likely to be considerable. Note that one objective of the project is for renewables to provide 5% of an unspecified electricity demand in the year 2015.

Thus, this reviewer agrees with the last sentence of para 8:

“A regional energy programme should also aim, among other things, at providing governments with assistance in doing so (meaning implementing DSM programs)”.

Para 10 starts

“An important characteristic of RET is that there are high investment costs because the fuel equivalent for the life cycle of the system is essentially purchased at one time.”

This is not strictly true. RET have maintenance and other operating costs as well. They do tend to be more capital intensive than most non-renewable options.

The same paragraph continues:

“This characteristic, together with the usually large existing foreign debts and high prevailing rates of interest in developing countries, makes access to investment capital an essential requirement for the widespread use of RET systems.”

The PDF Final Report came to the opposite conclusion (Executive Summary, p.8):

- *The assessment of this anticipated barrier revealed little evidence that the low level of RE products installed or RE projects realised has been directly influenced by financial shortages.*
- *It was found that manufacturers and dealers of RE products (with the main product being Solar Water Heaters SWH) had access to financing to a satisfactory extent.*
- *Loans at commercial conditions are available, and no difference is made between RE projects and other commercial investment projects.*
- *In most of the Caribbean countries financing of SWH can be included in the mortgage for houses and buildings.*
- *Most of the Caribbean countries have access to international financing sources, with the exception of a few countries, like Cuba, Guyana, and perhaps Suriname.*

The Project Brief should reconcile its observations with those of the PDF Report. Indeed, the RE finance barriers listed in the Table following para 13 mention “insufficient acceptance of RE, lack of project developers and lack of project development” as barriers and not lack of financing *per se*.

Perhaps “lack of project development” should be deleted, since this is a consequence of the previous two items mentioned.

In the same Table, “Lack of systematic RE resource assessment” is listed under “Policy related barriers”. Perhaps it should be listed among the “Awareness and information barriers”.

The last item in the same Table might be modified as follows:

- Insufficient availability and management of relevant renewable resource and energy demand data. Strengthening and improving the existing Energy Information System in the Caribbean is crucial for the success of any regional energy project in general, and especially for RE projects.

6. CRITICAL ANALYSIS OF THE SITUATION

While the Project Brief does not go into details, the list of barriers to be overcome, listed in Sec. 2.1, appears to be excellent except for the minor comments presented in Sec. 5 of this review, above.

7. ACTIVITIES

The Activities are described in the text of the Project Brief, with additional details in the Incremental Cost Matrix of Annex A. Some sort of time line should be provided for the activities, however approximate. This should also include a tentative GEF and other fund disbursement schedule for each of the five project years.

The Activities are appropriately divided into four groups.

Some observations follow, mostly minor.

Activity 1.1 is described as “Establish Regional Development Facility (PMU)” in the Incremental Cost Matrix of Annex A, but as “Policy Development Facility” in the text (Section 3.1.1). Moreover, PMU is not defined. Clearly Activity 1.1 needs to be better named. Moreover, “Policy Development Facility”, besides using the ambiguous word “Facility”, shares the abbreviation with GEF’s Project Development Fund. Why not “Policy Development Unit or Support Group”?

There is a similar problem with the name for Activity 1.2. The text title should reflect an activity rather than the name of a committee. For instance, “Appoint a National Policy Advisory Committee”. Again check for consistency with the designation in the Incremental Cost Matrix. ***These observations stand for all Activities.***

The first sentence of para 23 refers to “a central consulting facility” which probably refers to the same “Unit”. Please clarify.

Para 21 lists possible services to be provided to governments. This reviewer proposes a different order to the list, closer to a chronological one:

- Review and development of appropriate energy policy;
- Preparation of energy policy documents;
- Identification and removal of taxation and other disincentives to RE where they exist;
- Review and assistance in developing appropriate energy legislation;
- Assessment of RE resources;
- Conduct of Energy End Use surveys;
- Preliminary planning of DSM projects;
- Conduct and evaluation of pre-feasibility and feasibility studies in RE projects;
- Preparation of project documents;
- Negotiation of Power Purchase Agreements with utilities;
- Assisting utilities to establish Integrated Resource Planning.
- Assessment of the impact of DSM and RE on local environment and on greenhouse gas emissions;
- Assessment of the social and environmental impact of fossil fuel use, so as to give a fair valuation to RE projects; and

Sec. 3.1.3 (Expected Results) lists as the first item the removal of *all* disincentives against RE. This seems to be a tall order, considering that some RE options have high capital cost, and this project (or any other) can completely remove this disincentive. I suggest replacing “all” with “most” in the sentence.

The 2nd item on the same list should be modified to read:

- Identified and quantified their principal RE resources for electricity generation.

The 3rd item on the same list should be modified to read:

- Identified and quantified major end uses of electricity, and future growth of electricity end use services.

The Table following para 27 (4th item) should be modified to read “integrated *electricity* planning”

The 3rd item within “Increase attractiveness of RE investments” states:

- Evaluate avoided cost principles and least cost capacity planning criteria used by the utilities with respect to discriminating practices;

This is not clear.

Further down in the same Table, the use of “CC” to refer to Caribbean countries is confusing on two counts. First, the abbreviation is normally used for Climate Change (and appears as such in the list of acronyms and abbreviations of the Brief). Also it is not clear if one is referring only to the countries participating in this project or Caribbean countries in general.

In general, the Activities 2 are well described, except for the above observations.

The Expect Results of the Activities 2 are a number of demonstration projects. Para 33 lists some possibilities but keep in mind that there is a difference of several orders of magnitude among the different items in the list. For instance, a rural PV electrification unit or a solar water heater might cost US\$ 800, while a wind farm might be several million dollars. Moreover the first two are decentralized options while a wind farm is grid connected. A successful demonstration project for a wind farm would include equipment, financing, and a power sale agreement. A solar water heater or PV demonstration would also include marketing and dissemination, provision of maintenance and other services, as well as equipment and financing. Mention might be made of the different scales involved in the various RET and how this might affect the content of demonstration projects.

Activities 3 relate to capacity building. Of these only 3.4 is very clearly stated. Are the details of the other components to be determined as a consequence of Activity 3.1 (Planning Workshop for Capacity Building)?

The description of Activity 3.1 in paras 40, 41 and 42 is repetitive and confusing. How are the activities listed in the Table following para 42 related to the workshop?

Para 44: Explain what ZOPP/OOPP or PCM mean. This para is also repetitive.

Can one not have a baseline plan for capacity building based on the PDF Final Report? Activity 3.1 could then adapt the plan and put in time lines.

In synthesis, Sec. 3.3.1 needs to be rewritten.

Sec. 3.3.2 (Activity 3.2). In this section, there seems to be an emphasis on wind power and on the problems of grid connections. Given the rest of the Project Brief, mention should also be made of smaller-scale and decentralized renewables. The experience in other countries close to the region (e.g. Mexico and Costa Rica) should also be useful, and could be mentioned. There are a number of typographical and other minor errors in this section.

Sec. 3.3.3 (Activity 3.3).

Para 52. Does CTCS have the necessary expertise in-house or would they mainly arrange for consultants? Is the latter meant by “excellent vehicle”?

Section 3.3.5 Expected Results. First and last items on list are not clear. 2nd item could be rephrased as follows:

- Questions from the target group can be answered and an assessment of RET options can be carried out to determine whether an in-depth feasibility study is justified;

Activity 4.1. How are the items listed in para 57 different from Activities 3.2 and 3.3?

Activities 4.2 and 4.3 are well formulated.

Activity 4.4 is also well formulated. Some minor observations follow.

Para 69, 2nd sentence: Not only geography but language can be a barrier too. Cuba is listed among the requesting countries, indeed it is by far the largest country. Most of the remaining countries are English speaking. The web pages should be in English /French /Spanish to be useful to all countries in the region, and also outside the region. While this GEF project is meant to help 16 Caribbean countries, not only will the experience from outside the region be useful in these countries, but the experience gained in the course of the proposed project would be useful and should be available.

2nd item in the bulleted list in para 69: Also include countries from outside the immediate region, for example Mexico and Central America.

Last item in the bulleted list in para 69: Provide examples of unsuccessful RE projects as well!! One can often learn more from failure.

8. NATIONAL PRIORITIES AND COMMUNITY PARTICIPATION

The region as a whole has a very strong dependence on petroleum fuels, which is moreover imported, causing a balance of payments problem. The increased use of renewable energy would help reduce this problem. Moreover, the decentralized renewables would permit rural electrification and development. Some of the countries have programs to promote RET, including tax incentives. The GEF project would strengthen these initiatives and make them more sustainable.

There is no mention of community participation in the project.

9. INSTITUTIONAL ARRANGEMENTS

These appear to be well thought through and based on contacts made during the Project Development Phase. Project implementation would build on existing institutions.

10. TIME FRAME

The five year time frame is adequate for the activities to be undertaken. However, the Project Brief should include a time line for these activities.

11. FUNDING

GEF funding is adequate for all activities mentioned except project implementation. However successful implementation of projects would require commercial loan funds to be available for these projects. Here GEF loan guarantees could make commercial loans a reality.

12. INNOVATIVE FEATURES / REPLICABILITY

A coordinated regional effort including many small countries provides adequate scale both for high quality enabling abilities as well as for attracting financing by aggregating similar projects. Moreover, this collaboration could lead to similar energy policies to be developed in all these countries and possibly others in the region.

13. SUSTAINABILITY

Insofar as many of the barriers facing RET are overcome in the course of the proposed project, and a project development infrastructure is created, RE projects in the future would become more feasible under commercial conditions.

14. DEVELOPMENT DIMENSIONS AND RATIONALE FOR GEF SUPPORT

The development dimension has been mentioned in (National Priorities). The coincidence of the potential for reduction of CO₂ emissions with national and development objectives provides excellent rationale for GEF support.

15. ADDITIONAL COMMENTS

The list of acronyms and abbreviations should be completed to include the following:

BOT/BOO, etc.

CARILEC

CAST. Where is this located? Specify.

CERMES. Where is this located? Specify.

CSES

EE Is this is electricity efficiency or energy efficiency.

FSEC

HEART/NTA

IPP

JPS

NFP

OPP

PCM

PMU

PPA

RET should be Renewable Energy Technologies (plural, as it is used in the text)

SRC

UTECH

UWICED

ZOPP (translation)

Moreover, there are many typographical errors in the use of the abbreviations in the text and in the Annexes. These should be checked and corrected. The Incremental Cost Matrix of Annex is particularly plagued with errors.

ANNEX C1

RESPONSE TO STAP ROSTER TECHNICAL REVIEW

The roster reviewer indicated that this project deals with an important area - reducing the barriers to the entry of renewable energy technologies in a region – and that the project serves national and developmental objectives, in addition to climate change mitigation. The reviewer indicated that the project approach is excellent, the objectives are valid, the background and justification are generally clearly stated, and that the institutional arrangements are well thought through. The coincidence of the potential for reduction of CO₂ emissions with national and development objectives provides excellent rationale for GEF support, and the GEF project should strengthen existing RET initiatives making them more sustainable.

However, the reviewer also highlighted areas for clarification and improvement, which are addressed in the response below and throughout the Project Brief as noted.

OBJECTIVES

- *The project objectives are valid. There is, however, some confusion as to the scope. One area of confusion is whether the renewable energy projects are intended for electricity generation or for energy in general. ... This reviewer concludes that only renewable **electricity generation** was intended in the project and this should be explicitly stated.*

Throughout the project proposal the intent is to focus on “electricity generation” since only this may have a significant impact on CO₂ avoidance. The correct wording, therefore is electricity generation and/or the use or generation of commercial electricity. However, some countries tend to include REs like solar crop drying, which in our understanding should only be considered under this project as far as replacement of electricity will be concerned. The same applies for Solar Water Heating, which is meant to be an opportunity to replace electricity and is closely related to Electricity Efficiency and DSM.

Therefore, the language has been updated accordingly throughout the document and, in particular, in the Summary (cover page), paragraph 1, paragraph 15, and Annex A.

- *The Project Brief should specify the renewable energy technologies that are likely to be given priority in the proposed project, all the more so since these were identified during a previous GEF PDF report...Only in Annex A (Incremental Costs) of the Project Brief, under “System Boundary” is there a list of RET: “grid-connected renewable power (e.g. wind, biomass, small hydro), renewable rural electrification (photovoltaics) and solar water heating”. Indeed this list largely coincides (except for solar crop drying) with those RET identified in the PDF report. This reviewer believes that this list of RET should appear in the body of the report, certainly in Sec. 1.1.3.*

The types of RET that were identified in the PDF Report are included in paragraph 9. Further clarification of the RET under consideration is provided under Activity 2.1 – Pipeline of Demonstration Projects (paragraph 29). The final technology mix will be decided during

the project and in close co-operation with the project developers. It is expected to consist of all or some of the following RET: (i) grid-connected renewable power (e.g. wind, biomass, small hydro), (ii) renewable rural electrification (e.g. photovoltaics), and (iii) solar water heating.

- *Can the Objectives be met given the Activities outlined? ...The Objectives should include specific goals on GHG mitigation. Indeed, in spite of the confusion in the scope, one may identify a specific objective as increasing the renewable share of electricity generation to 5% in the year 2015 with a 680,000 ton reduction in CO₂ emissions. It is not immediately clear from the Activities described if this goal can be met and how. Most of the Expected Results (Sec. 3.1.3, para 25) are indeed enabling activities, which, by themselves, do not reduce CO₂ emissions. The last stated “Expected Result” which calls for all territories to “Have planned and carried out at least one, and perhaps several RE projects” appears to be a reasonable goal in furthering both renewable energy and regional cooperation.*

The Objectives have been clarified (paragraph 15) to include reference to an investment of US\$ 10 million in RE projects that result in the avoidance of 35,000 t/annum of CO₂ for Wind, and 17,000 t/annum in the case of PV/Hydro. The avoidance of 680,000 t/annum would be achieved if the present level of RE based electricity generation of 2% could be raised to 5%. Further, the “Expected Results” section has been reorganized as recommended (see paragraph 25).

BACKGROUND AND JUSTIFICATION

- *Para 7 states: “The pursuit of efficiency in the use of energy (EE), usually in the form of Demand Side Management (DSM) is a higher priority....” Perhaps the document means to say that DSM should be a higher priority, considering its potential benefits.*

The reviewer’s suggestion has been incorporated into paragraph 7.

- *Para 10 starts: “An important characteristic of RET is that there are high investment costs because the fuel equivalent for the life cycle of the system is essentially purchased at one time.” This is not strictly true. RET have maintenance and other operating costs as well. They do tend to be more capital intensive than most non-renewable options.*

Here we refer to fuel costs, which in most cases of RET (e.g., PV, Hydro, Wind) are nearly negligible. It is acknowledged that maintenance and other operational costs for RET exist and are not often considered. Especially for PV, in many cases these O & M cost are not considered.

Therefore, paragraph 10 has been reworded as follows: “An important characteristic of RET is that there are high investment costs because the fuel equivalent for the life cycle of the system is essentially purchased at one time (i.e., fuel costs are negligible). While RET have maintenance and other operating costs, they do tend to be more capital intensive than most non-renewable options”.

- *The PDF Final Report came to the opposite conclusion (Executive Summary, p.8)... The Project Brief should reconcile its observations with those of the PDF Report. Indeed, the RE finance barriers listed in the Table following para 13 mention “insufficient acceptance of RE, lack of project developers and lack of project development” as barriers and not lack of financing per se.*

The important point regarding funding is not the availability of financing but rather that there exist problems in gaining access to this financing. Commercial Banks are normally willing to finance RE investment projects as long as the bank requirements are met and the bank is convinced that the technologies work reliably. Therefore, the challenge is to formulate and present bankable projects.

The above has been included in paragraph 10.

- *Perhaps “lack of project development” should be deleted, since this is a consequence of the previous two items mentioned. In the same Table, “Lack of systematic RE resource assessment” is listed under “Policy related barriers”. Perhaps it should be listed among the “Awareness and information barriers”.*

The phrase “lack of project development” has been removed from the table following paragraph 13. The phrase “lack of systematic RE resource assessment” has been moved under “Awareness and information barriers” as suggested.

- *The last item in the same Table might be modified as follows: Insufficient availability and management of relevant renewable resource and energy demand data. Strengthening and improving the existing Energy Information System in the Caribbean is crucial for the success of any regional energy project in general, and especially for ~~re~~ RE projects. ~~particularly, when it comes to RE resource assessment~~*

The suggested change has been made in the Table.

ACTIVITIES

- *The Activities are described in the text of the Project Brief, with additional details in the Incremental Cost Matrix of Annex A. Some sort of time line should be provided for the activities, however approximate. This should also include a tentative GEF and other fund disbursement schedule for each of the five project years.*

A project timetable has been included in Figure 1, with references to this Figure given in paragraphs 17 and 75. The fund disbursement schedule will be provided in the Project Document.

- *Activity 1.1 is described as “Establish Regional Development Facility (PMU)” in the Incremental Cost Matrix of Annex A, but as “Policy Development Facility” in the text (Section 3.1.1). Moreover, PMU is not defined. Clearly Activity 1.1 needs to better named. Moreover, “Policy Development Facility”, besides using the ambiguous word “Facility”,*

shares the abbreviation with GEF's Project Development Fund. Why not "Policy Development Unit or Support Group"?

Activity 1.1 has been renamed as "Establishment of Policy Development Advisory Unit", and this terminology has been consistently applied throughout the document (including Annex A).

- *There is a similar problem with the name for Activity 1.2. The text title should reflect an activity rather than the name of a committee. For instance, "Appoint a National Policy Advisory Committee". Again check for consistency with the designation in the Incremental Cost Matrix. These observations stand for all Activities.*

Activity 1.2 has been renamed "Appoint a National Policy Advisory Committee" as suggested. Similar changes have been made to the titles of Activities 2.1, 2.2, 2.3, 3.3, and 3.4.

- *The first sentence of para 23 refers to "a central consulting facility" which probably refers to the same "Unit". Please clarify.*

The sentence refers to the Policy Development Advisory Unit, and has been clarified as such in the document.

- *Para 21 lists possible services to be provided to governments. This reviewer proposes a different order to the list, closer to a chronological one:*

The reviewer's suggested sequence has been noted, however, the preparation of policy documents can only be done after assessments of existing discriminations and shortcomings, demands and other barriers. The revised list of possible services is provided in paragraph 21.

- *Sec. 3.1.3 (Expected Results) lists as the first item the removal of all disincentives against RE. This seems to be a tall order, considering that some RE options have high capital cost, and this project (or any other) can completely remove this disincentive. I suggest replacing "all" with "most" in the sentence. The 2nd item on the same list should be modified to read: Identified and quantified their principal RE resources for electricity generation. The 3rd item on the same list should be modified to read: Identified and quantified major end uses of electricity, and future growth of electricity end use services.*

The suggestions have been adopted in paragraph 25.

- *The Table following para 27 (4th item) should be modified to read "integrated electricity planning"*

The suggestion has been adopted in the table following paragraph 27.

- *The 3rd item within "Increase attractiveness of RE investments" states: Evaluate avoided cost principles and least cost capacity planning criteria used by the utilities with respect to discriminating practices. This is not clear.*

It is important that the utilities make transparent their basis for calculating their costs. Often costs like administration, depreciation, interest on capital cost, environmental impacts, etc. are not included in ‘avoided costs’ and, often, these avoided costs are not more than avoided fuel costs.

- *Further down in the same Table, the use of “CC” to refer to Caribbean countries is confusing on two counts. First, the abbreviation is normally used for Climate Change (and appears as such in the list of acronyms and abbreviations of the Brief). Also it is not clear if one is referring only to the countries participating in this project or Caribbean countries in general.*

This terminology has been clarified in the document and refers to the countries participating in the project.

- *The Expect Results of the Activities 2 are a number of demonstration projects. Mention might be made of the different scales involved in the various RET and how this might affect the content of demonstration projects.*

Indeed, the RET under this project will vary widely in terms of capital cost per unit, of mode of operation (off-grid or grid-connected) and the dissemination approach concerned. Reference to this variation is included in paragraph 33.

- *Activities 3 relate to capacity building. Of these only 3.4 is very clearly stated. Are the details of the other components to be determined as a consequence of Activity 3.1 (Planning Workshop for Capacity Building)? Can one not have a baseline plan for capacity building based on the PDF Final Report? Activity 3.1 could then adapt the plan and put in time lines. In synthesis, Sec. 3.3.1 needs to be rewritten.*

The workshop is the first activity and will provide the basis for the other activities that will be defined at the workshop (e.g., Activities 3.2, 3.3, and 3.4). Additional clarification has been provided under section 3.3.1 (Activity 3.1),

- *The description of Activity 3.1 in paras 40, 41 and 42 is repetitive and confusing... Para 44: Explain what ZOPP/GOPP or PCM mean. This para is also repetitive.*

Paragraphs 41, 42 and 44 have been revised (now paragraph 41 under revised numbering). GOPP stands for “Goal Oriented Project Planning”.

- *How are the activities listed in the Table following para 42 (now 41) related to the workshop?*

This list of activities includes possible activities that will have to be defined and endorsed by the workshop. Paragraph 41 has been amended to reflect the above.

- *Sec. 3.3.2 (Activity 3.2). In this section, there seems to be an emphasis on wind power and on the problems of grid connections. Given the rest of the Project Brief, mention should also be made of smaller-scale and decentralized renewables. The experience in other countries close to the region (e.g. Mexico and Costa Rica) should also be useful, and could be mentioned.*

Although much emphasis from the participating countries is on wind power, capacity building measures will have to strengthen the technical and managerial capacity of the staff of utilities in order to deal with other RET as well, including hydropower, solar energy or biomass. The above has been clarified in Activity 3.2.

- *Sec. 3.3.3 (Activity 3.3). Para 52 (now 51) Does CTCS have the necessary expertise in-house or would they mainly arrange for consultants? Is the latter meant by “excellent vehicle”?*

CTCS has access to local and regional expertise, not in-house expertise. They arrange for local or regional expertise under the guidance of the Project Management Unit that will be responsible for the provision of all consultancy services, be it local, regional or international.

The term “excellent vehicle” may be too strong, and the text has been revised as “CTCS can serve as an existing and experienced instrument for regional consultancy services, which will be complemented by international expertise.”

- *Section 3.3.5 Expected Results. First and last items on list are not clear. 2nd item could be rephrased as follows: Questions from the target group can be answered and an assessment of RET options can be carried out to determine whether an in-depth feasibility study is justified;*

The suggested revision of the second item has been made in the document. The first item should read: “Staff of utility companies will be strengthened in their capability to evaluate and assess RET”.

- *Activity 4.1. How are the items listed in para 57 (now 56) different from Activities 3.2 and 3.3?*

While 3.2 and 3.3. are concentrating on Capacity Building, this activity mainly concentrates on building awareness and providing information. An overlapping of activities will have to be avoided during the process of activity planning during the implementation of the project. Paragraph 56 has been updated accordingly.

- *Para 69 (now 68), 2nd sentence: Not only geography but language can be a barrier too. 2nd item in the bulleted list in para 69 (now 68): Also include countries from outside the immediate region, for example Mexico and Central America. Last item in the bulleted list in para 69: Provide examples of unsuccessful RE projects as well!! One can often learn more from failure.*

The barrier of language pointed out by the reviewer is noted, and has been added to document in paragraph 68. It is also noted that the web pages should be in English /French

/Spanish to be useful to all countries in the region, and also outside the region. Other suggested amendments have been made in paragraph 68.

NATIONAL PRIORITIES AND COMMUNITY PARTICIPATION

- *There is no mention of community participation in the project.*

There will be a Community Participation component prepared as required during the project. The relatively decentralized project activities to be conducted will involve utilities or private investors, with governments as primary stakeholders. Prefeasibility and feasibility studies will involve local stakeholders in analysis and decision making as required.

TIME FRAME

- *The five year time frame is adequate for the activities to be undertaken. However, the Project Brief should include a time line for these activities.*

A timetable has been provided in Figure 1.

ADDITIONAL COMMENTS

- *The list of acronyms and abbreviations should be completed... Moreover, there are many typographical errors in the use of the abbreviations in the text and in the Annexes. These should be checked and corrected.*

The above has been noted and the document, including the List of Acronyms and Abbreviations, has been revised accordingly.